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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,081	11/19/2001	Richard A. Domanik	13389.8USU1	9299
23552	7590	11/16/2004	EXAMINER	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			LAVIN, CHRISTOPHER L	
			ART UNIT	PAPER NUMBER
			2621	

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/989,081

Applicant(s)

DOMANIK ET AL.

Examiner

Christopher L Lavin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 - 31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 4, 5, 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham (4,513,438) in view of Flinois (5,054,097).

5. In regards to claim 1, Graham discloses a method of correlating two microscope observations. In figure 1 Graham discloses the microscope device. In Figures 5A and 5B and further described in the paragraph starting at column 5, line 32 Graham discloses the capturing of the first microscope observation and the capturing of the second microscope observation. Step 4 in both figures 5A and 5B forms an image. In the paragraph starting at column 7, line 23 Graham discloses selecting two or more points on the first image and two or more corresponding points on the second image. Graham discloses that objects of interest are marked on all images, these objects of interest are then matched together. An object of interest is two or more points, and corresponding objects of interest will be marked on both images. Although Graham finds matches between images the patent does not teach of performing an image transformation to align the two images.

6. Flinois teaches of an image alignment system and process. In step three in column 11 Flinois discloses calculating a transformation based on the selected points to align the first and second images ("A geometric planar transformation ... is then calculated"). In step five Flinois discloses transforming the second image to align the first image with the second image ("The resultant image is then scanned line by line to transform positions of the first image into pixel positions of the resultant image").

7. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the image alignment method taught by Flinois to align the pairs obtained from Graham. Physically aligning the two images will allow for easier comparisons, if this alignment was not performed it is highly likely that one image would

be off skew or at a different magnification. These differences would make comparison and review more difficult.

8. In regards to claim 2, Flinois in the paragraph starting at column 10, line 35 discloses that a user selects two or more points on the first image and locates two or more corresponding points on the second image.

9. In regards to claim 4, Graham discloses that objects of interest are located in the first image in column 2, lines 26 – 35.

10. In regards to claim 5, Graham discloses that centroid information is calculated for possible objects of interest in column 6, lines 12 – 19.

11. In regards to claim 8, Graham discloses that objects of interest are located in the second image in column 2, lines 26 – 35. Locating objects of interest is equivalent to segmenting the image into objects of interest and background.

12. In regards to claim 9, since the two images are combined in claim 1, anything done to the second image would affect the first image. So segmenting the second image as done in claim 8 will segment the first image.

13. In regards to claim 10, Graham discloses in column 2, lines 25 – 26 that “cervical cells on a microscope slide” are viewed.

14. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois as applied to claim 1 above, and further in view of Lee (5,528,703).

15. In regards to claims 3 and 7, Graham in view of Flinois discloses the method of claim 1. Graham in view of Flinois does not disclose a shading correction step.

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16. Lee teaches that variations in brightness occur during imaging, and thus require shading correction. Lee teaches in the paragraph starting at column 5, line 9 that brightness levels are measured and then scaled ("the determination of step 300 is made to effectively scaled the brightness of the subject field of view"). This constitutes shading correction.

17. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform shading correction as taught by Lee on the images obtained by Graham in view of Flinois. Shading correction reduces variations in lighting from one image to another. By reducing variations, matches can be more easily found and images can be aligned with less difficulty.

18. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois as applied to claim 4 above, and further in view of Lee (5,528,703).

19. In regards to claim 6, Graham in view of Flinois discloses the method of claim 4. Graham in view of Flinois does not disclose a skeletonizing step.

20. Lee teaches in the paragraph starting at column 9, line 51 that skeletonizing is performed on an image ("objects of the mask ... are eroded") the mask formed can then be used to further skeletonize an image by masking off all of the background so only the objects of interest are seen.

21. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform skeletonizing as taught by Lee on the images obtained by Graham in view of Flinois. By skeletonizing an image only the objects of interest will be visible allowing for a more unobstructed view of an area and a better diagnosis.

22. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois as applied to claim 1 above, and further in view of Lee (5,528,703).

23. In regards to claims 15 and 16, Graham in view of Flinois discloses the method of claim 1. Graham in view of Flinois does not disclose a thresholding step.

24. Lee teaches in the paragraph starting at column 7, line 37 that a "threshold test to identify objects of interest" is performed. That test sets values "greater than or equal to the threshold intensity value ... to one" and sets values "less than or equal to the threshold intensity value ... to zero."

25. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform thresholding as taught by Lee on the images obtained by Graham in view of Flinois. By thresholding an image only the objects of interest will be brought out which makes masking and skeletonizing easier to perform.

26. Claims 11 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois as applied to claim 4 above, and further in view of Dolbeare (4,345,027).

27. In regards to claims 11 - 14, Graham in view of Flinois discloses the method of claim 10. Graham in view of Flinois does not disclose the staining steps for studying cervical tissue on a microscope slide.

28. Dolbeare teaches in the paragraph starting at column 3, line 7 counterstaining a slide with an immunofluorescent stain and histochemical stain. Dolbeare performs the staining in a reverse order to that specified in the claims, but Dolbeare does not require

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this order, switching the order would not change the results. In column 3, lines 35 and 36 Dolbeare discloses that the fluorescent stain is used to bring out cellular features (in this case abnormal cells). In column 3, lines 62 – 64 Dolbeare discloses that the histochemical stain is sensitive to cellular objects (cellular material).

29. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform the staining steps taught by Dolbeare for studying the cervical tissue with the method of Graham in view of Flinois. Double staining is a well-known technique for staining a slide for detecting cervical cells; in particular fluorescence is often used for bringing out abnormal cells.

30. Claims 17 – 20, 24, 25, and 28 – 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois, and further in view of Dolbeare.

31. In regards to claims 17, 21 and 22, Graham discloses in column 2, lines 25 – 26 that “cervical cells on a microscope slide” are viewed. Inherent in a system using a microscope and a microscope slide is the step of placing the slide on a microscope. In Figures 5A and 5B and further described in the paragraph starting at column 5, line 32 Graham discloses the capturing of the first microscope observation and the capturing of the second microscope observation. In step three in column 11 Flinois discloses calculating a transformation based on the selected points to align the first and second images (“A geometric planar transformation ... is then calculated”). In step five Flinois discloses transforming the second image to align the first image with the second image (“The resultant image is then scanned line by line to transform positions of the first



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image into pixel positions of the resultant image"). Graham in view of Flinois does not disclose the staining steps for studying cervical tissue on a microscope slide.

32. Dolbeare teaches in the paragraph starting at column 3, line 7 staining and counterstaining a slide with an immunofluorescent stain and histochemical stain.

Dolbeare performs the staining in a reverse order to that specified in the claims, but Dolbeare does not require this order, switching the order would not change the results.

In column 3, lines 35 and 36 Dolbeare discloses that the fluorescent stain is used to bring out cellular features (in this case abnormal cells). In column 3, lines 62 – 64 Dolbeare discloses that the histochemical stain is sensitive to cellular objects (cellular material).

33. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform the staining steps taught by Dolbeare for studying the cervical tissue with the method of Graham in view of Flinois. Double staining is a well-known technique for staining a slide for detecting cervical cells; in particular fluorescence is often used for bringing out abnormal cells. Dolbeare does not teach that the slide should be viewed after the first staining and then reexamined after the second staining. However viewing the image once after the complete staining accomplishes the same thing of bringing out both the cellular features and cellular objects as viewing it twice. As Graham teaches of viewing the slide twice it would have been obvious to one having ordinary skill in the art at the time of the invention to view the slides twice, once after the initial staining and again after the counterstaining. Following this order would

allow for easier computing to detect just the cellular features and then during the second imaging to detect just the cellular objects.

34. In regards to claim 18, Graham discloses a process of correlating two microscope observations. In the paragraph starting at column 7, line 23 Graham discloses selecting two or more points on the first image and two or more corresponding points on the second image. Graham discloses that objects of interest are marked on all images, these objects of interest are then matched together. An object of interest is two or more points, and corresponding objects of interest will be marked on both images. Although Graham finds matches between images the patent does not teach of performing an image transformation to align the two images.

35. Flinois teaches of an image alignment system and process. In step three in column 11 Flinois discloses calculating a transformation based on the selected points to align the first and second images ("A geometric planar transformation ... is then calculated"). In step five Flinois discloses transforming the second image to align the first image with the second image ("The resultant image is then scanned line by line to transform positions of the first image into pixel positions of the resultant image").

36. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the image alignment method taught by Flinois to align the pairs obtained from Graham. Physically aligning the two images will allow for easier comparisons, if this alignment was not performed it is highly likely that one image would be off skew or at a different magnification. These differences would make comparison and review more difficult.

37. In regards to claim 19, Graham discloses that objects of interest are located in the second image in column 2, lines 26 – 35. Locating objects of interest is equivalent to segmenting the image into objects of interest and background. Since the two images are combined in claim 17, anything done to the second image would affect the first image. So segmenting the second image will segment the first image.

38. In regard to claim 20, Flinois in the paragraph starting at column 10, line 35 discloses that a user selects two or more points on the first image and locates two or more corresponding points on the second image.

39. In regards to claim 24, Graham discloses that objects of interest are located in the first image in column 2, lines 26 – 35.

40. In regards to claim 25, Graham discloses that centroid information is calculated for possible objects of interest in column 6, lines 12 – 19.

41. In regards to claim 28, Graham discloses that objects of interest are located in the second image in column 2, lines 26 – 35. Locating objects of interest is equivalent to segmenting the image into objects of interest and background.

42. In regards to claim 29, since the two images are combined in claim 17, anything done to the second image would affect the first image. So segmenting the second image as done in claim 28 will segment the first image.

43. Claims 23 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois and Dolbeare as applied to claim 17 above, and further in view of Lee (5,528,703).

44. In regards to claims 23 and 27, Graham in view of Flinois and Dolbeare discloses the process of claim 17. Graham in view of Flinois and Dolbeare does not disclose a shading correction step.

45. Lee teaches that variations in brightness occur during imaging, and thus require shading correction. Lee teaches in the paragraph starting at column 5, line 9 that brightness levels are measured and then scaled ("the determination of step 300 is made to effectively scaled the brightness of the subject field of view"). This constitutes shading correction.

46. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform shading correction as taught by Lee on the images obtained by Graham in view of Flinois and Dolbeare. Shading correction reduces variations in lighting from one image to another. By reducing variations, matches can be more easily found and images can be aligned with less difficulty.

47. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois and Dolbeare as applied to claim 24 above, and further in view of Lee (5,528,703).

48. In regards to claim 26, Graham in view of Flinois and Dolbeare discloses the process of claim 24. Graham in view of Flinois and Dolbeare does not disclose a skeletonizing step.

49. Lee teaches in the paragraph starting at column 9, line 51 that skeletonizing is performed on an image ("objects of the mask ... are eroded") the mask formed can then

be used to further skeletonize an image by masking off all of the background so only the objects of interest are seen.

50. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform skeletonizing as taught by Lee on the images obtained by Graham in view of Flinois and Dolbeare. By skeletonizing an image only the objects of interest will be visible allowing for a more unobstructed view of an area and a better diagnosis.

51. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graham in view of Flinois and Dolbeare as applied to claim 17 above, and further in view of Lee (5,528,703).

52. In regards to claims 15 and 16, Graham in view of Flinois and Dolbeare discloses the process of claim 17. Graham in view of Flinois and Dolbeare does not disclose a thresholding step.

53. Lee teaches in the paragraph starting at column 7, line 37 that a "threshold test to identify objects of interest" is performed. That test sets values "greater than or equal to the threshold intensity value ... to one" and sets values "less than or equal to the threshold intensity value ... to zero."

54. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to perform thresholding as taught by Lee on the images obtained by Graham in view of Flinois and Dolbeare. By thresholding an image only the objects of interest will be brought out which makes masking and skeletonizing easier to perform.

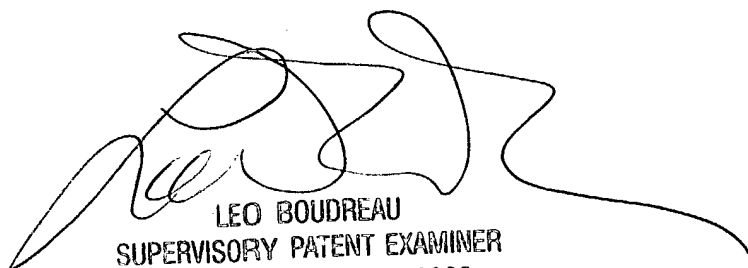
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L Lavin whose telephone number is 703-306-4220. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLL



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